CLAIMS

What we claim is:

1. A method of making a monomeric functionalized oil, comprising the step of:

carbonating an epoxidized vegetable oil, wherein a carbonated vegetable oil is produced.

2. The method of claim 1, wherein the epoxidized oil is epoxidized soybean oil (ESBO) and the produced carbonated oil is carbonated soybean oil (CSBO).

3. The method of claim 1, wherein the carbonating step includes reacting epoxidized soybean oil with carbon dioxide.

4. The method of claim 1, including a catalyst present for the carbonation.

5. The method of claim 4, wherein the catalyst is tetrabutylammonium bromide (TBAB).

6. The method of claim 1, wherein the epoxidized oil is converted to carbonated oil without any significant side reactions occurring.

7. A method of producing a carbonated soybean oil, comprising:

reacting an epoxidized soybean oil (ESBO) with carbon dioxide.

__ 8. A method of converting an epoxide ring to a five-membered cyclic carbonate ring, comprising a step of:

reacting a starting material that contains an epoxide ring with carbon dioxide, wherein the epoxide ring is converted to a five-membered cyclic carbonate ring.

9. The method of claim 8, wherein the starting material is an epoxidized oil.

10. The method of claim 9, wherein the starting material is an epoxidized vegetable oil.

11. The method of claim 8, wherein the starting material is epoxidized soybean oil (ESBO).

12. The method of claim 8, wherein the starting material is converted to a carbonated oil.

13. The method of claim 12, wherein the starting material is converted to a carbonated vegetable oil.

14. The method of claim 13, wherein the starting material is converted to a carbonated soybean oil (CSBO).

15. The method of claim 8, wherein the starting material is converted to a monomeric reaction product having the cyclic carbonate ring, without a significant side reaction occurring.

16. A modified vegetable oil comprising:

a carbonated vegetable oil.

17. The modified vegetable oil of claim 16, wherein the carbonated vegetable oil is carbonated soybean oil.

18. A modified vegetable oil comprising:

a vegetable oil containing cyclic carbonate groups.

19. The modified vegetable oil of claim 18, wherein the vegetable oil is soybean oil.

20. A method of making a nonisocyanate polyurethane network, comprising:

mixing

(1) a carbonated vegetable oil and

(2) an amine having functionality of at least two.

21. The method of claim 20, wherein the carbonated vegetable oil and amine are mixed stoichiometrically at or within nearly balanced stoichiometry.

22. The method of claim 20, wherein the carbonated vegetable oil is carbonated soybean oil.

23. The method of claim 20, wherein the amine is selected from the group consisting of ethylenediamine (ED), hexamethylenediamine (HMD), and tris(2-aminoethyl) amine (TA).

24. The method of claim 20, wherein a viscous solution is produced from the mixing, and the viscous solution is transferred into a mold, followed by curing.

25. A polyurethane network comprising:

a nonisocyanate polyurethane network produced from a carbonated vegetable oil.